STAND OF AMARILLO, INC.
DON MONIAK
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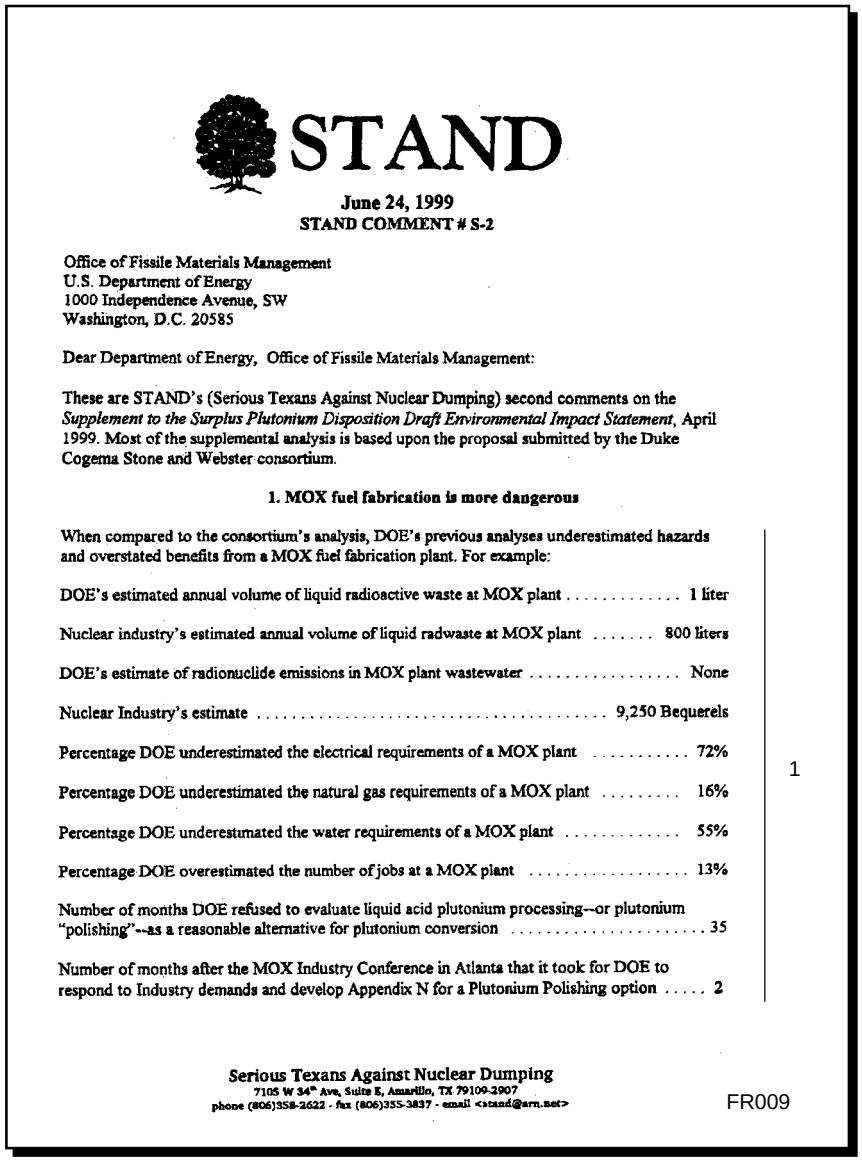

STAND

June 24, 1999
STAND COMMENT # S-2

Office of Fissile Materials Management
U.S. Department of Energy
1000 Independence Avenue, SW
Washington, D.C. 20585

Dear Department of Energy, Office of Fissile Materials Management:

These are STAND's (Serious Texans Against Nuclear Dumping) second comments on the *Supplement to the Surplus Plutonium Disposition Draft Environmental Impact Statement*, April 1999. Most of the supplemental analysis is based upon the proposal submitted by the Duke Cogema Stone and Webster consortium.

1. MOX fuel fabrication is more dangerous

When compared to the consortium's analysis, DOE's previous analyses underestimated hazards and overstated benefits from a MOX fuel fabrication plant. For example:

DOE's estimated annual volume of liquid radioactive waste at MOX plant ..... 1 liter

Nuclear industry's estimated annual volume of liquid radwaste at MOX plant ..... 800 liters

DOE's estimate of radionuclide emissions in MOX plant wastewater ..... None

Nuclear Industry's estimate ..... 9,250 Bequerels

Percentage DOE underestimated the electrical requirements of a MOX plant 72%

Percentage DOE underestimated the natural gas requirements of a MOX plant 16%

Percentage DOE underestimated the water requirements of a MOX plant 55%

Percentage DOE overestimated the number of jobs at a MOX plant 13%

Number of months DOE refused to evaluate liquid acid plutonium processing--or plutonium "polishing"--as a reasonable alternative for plutonium conversion 35

Number of months after the MOX Industry Conference in Atlanta that it took for DOE to respond to Industry demands and develop Appendix N for a Plutonium Polishing option 2

1

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FR009

FR009–1 **MOX Approach**

DOE acknowledges the commentor's opposition to the MOX approach. DOE has identified as its preferred alternative the hybrid approach. Pursuing both immobilization and MOX fuel fabrication provides the United States important insurance against potential disadvantages of implementing either approach by itself. The hybrid approach also provides the best opportunity for U.S. leadership in working with Russia to implement similar options for reducing Russia's excess plutonium in parallel. Further, it sends the strongest possible signal to the world of U.S. determination to reduce stockpiles of surplus plutonium as quickly as possible and in a manner that would make it technically difficult to use the plutonium in nuclear weapons again.

While it is true that some of the estimates in the SPD Draft EIS have increased as noted by the commentor, other estimates have decreased such as the number of workers required to operate the MOX facility and the worker dose estimate. While some estimates have increased, none of the increases are expected to result in major environmental impacts to the public during normal operations at any of the candidate sites as shown in Section 2.18 and Chapter 4 of Volume I.

On the basis of public comments received on the SPD Draft EIS, and the analysis performed as part of the MOX procurement, DOE has included plutonium polishing as a component of the MOX facility to ensure adequate impurity removal from the plutonium dioxide. Appendix N was deleted from the SPD Final EIS, and the impacts discussed therein were added to the impacts sections presented for the MOX facility in Chapter 4 of Volume I. Section 2.18.3 was also revised to include the impacts associated with plutonium polishing.

Section 4.28 was revised to discuss the potential environmental impacts of operating Catawba, McGuire, and North Anna, the reactors that would use the MOX fuel. These reactors were selected in part because their operational lives would not have to be extended to support the surplus plutonium disposition program.

As described in Sections 2.18.3 and 4.28.2.8, additional spent fuel would be produced by using MOX fuel instead of LEU fuel in domestic, commercial

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DON MONIAK
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2. Putting MOX in old nuclear reactors is a bad idea:

Age of Nuclear Reactors when first MOX fuel scheduled to be inserted	20 to 28 years
Age of Nuclear Reactors in 2020 when MOX fuel scheduled to leave	24 to 32 years
Number of extra spent fuel assemblies expected from MOX	199
Percentage DOE underestimated maximum radiation dose to people near reactors:	82-329%

1

These comments will be supplemented in the future.

Sincerely:

Don Moniak
Program Director
STAND, Inc.

FR009

reactors. However, spent fuel management at the proposed reactor sites is not expected to change dramatically due to the substitution of MOX assemblies for some of the LEU assemblies.

As discussed in Section 4.28.2.4, the radiation dose to the population in the vicinity of the proposed reactor sites is not expected to change from normal operation of the reactors with a partial MOX fuel core instead of a full LEU fuel core. The commentor states that DOE "underestimated maximum radiation dose to people near reactors" but it is impossible to determine how this was derived. The *Storage and Disposition PEIS* presented information on a generic reactor but this is not directly comparable to the specific reactor information presented in this SPD EIS.

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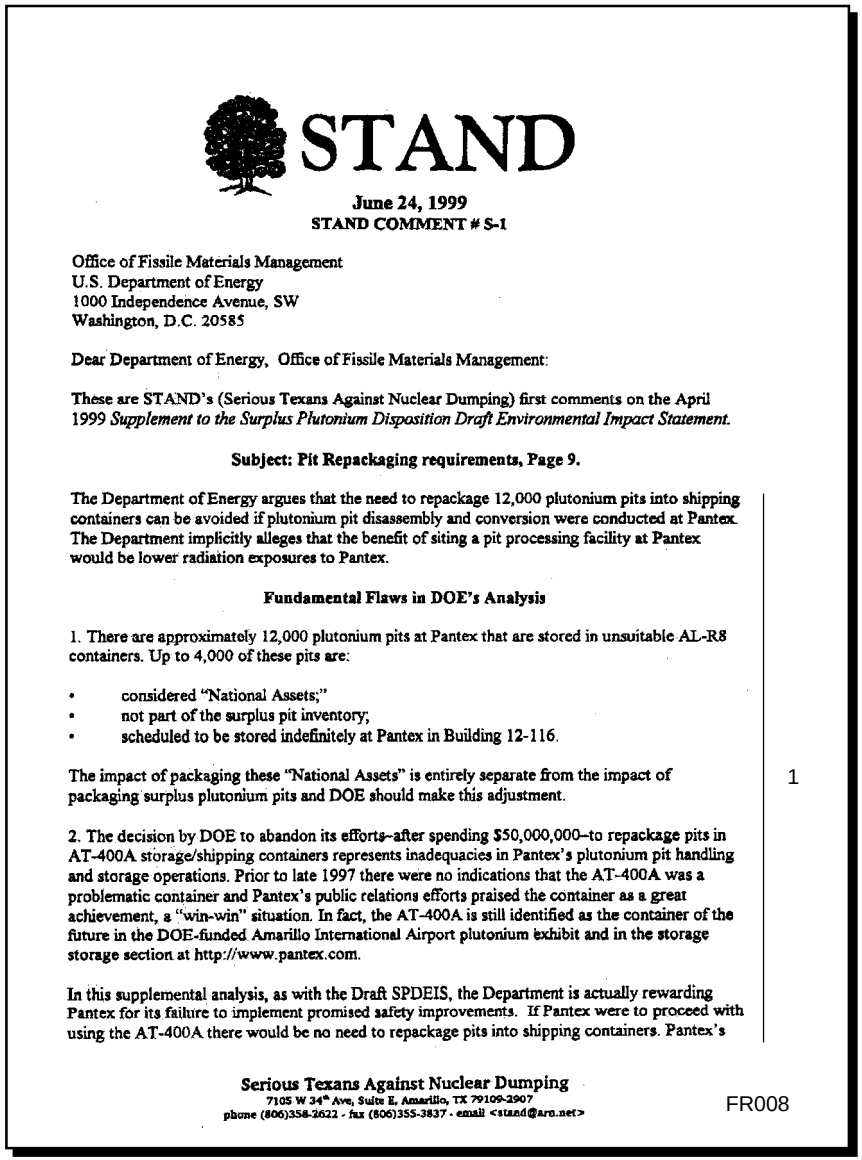

STAND

June 24, 1999
STAND COMMENT # S-1

Office of Fissile Materials Management
U.S. Department of Energy
1000 Independence Avenue, SW
Washington, D.C. 20585

Dear Department of Energy, Office of Fissile Materials Management:

These are STAND's (Serious Texans Against Nuclear Dumping) first comments on the April 1999 *Supplement to the Surplus Plutonium Disposition Draft Environmental Impact Statement.*

Subject: Pit Repackaging requirements, Page 9.

The Department of Energy argues that the need to repackage 12,000 plutonium pits into shipping containers can be avoided if plutonium pit disassembly and conversion were conducted at Pantex. The Department implicitly alleges that the benefit of siting a pit processing facility at Pantex would be lower radiation exposures to Pantex.

Fundamental Flaws in DOE's Analysis

1. There are approximately 12,000 plutonium pits at Pantex that are stored in unsuitable AL-R8 containers. Up to 4,000 of these pits are:

- considered "National Assets;"
- not part of the surplus pit inventory;
- scheduled to be stored indefinitely at Pantex in Building 12-116.

The impact of packaging these "National Assets" is entirely separate from the impact of packaging surplus plutonium pits and DOE should make this adjustment. 1

2. The decision by DOE to abandon its efforts–after spending $50,000,000–to repackage pits in AT-400A storage/shipping containers represents inadequacies in Pantex's plutonium pit handling and storage operations. Prior to late 1997 there were no indications that the AT-400A was a problematic container and Pantex's public relations efforts praised the container as a great achievement, a "win-win" situation. In fact, the AT-400A is still identified as the container of the future in the DOE-funded Amarillo International Airport plutonium exhibit and in the storage storage section at http://www.pantex.com.

In this supplemental analysis, as with the Draft SPDEIS, the Department is actually rewarding Pantex for its failure to implement promised safety improvements. If Pantex were to proceed with using the AT-400A there would be no need to repackage pits into shipping containers. Pantex's

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FR008

FR008–1 **Alternatives**

DOE acknowledges the commentor's concern regarding the storage of plutonium pits at Pantex. DOE is committed to the safe, secure storage of pits and is evaluating options for upgrades to Pantex Zone 4 facilities to address plutonium storage requirements. DOE has addressed some of the commentor's concerns in an environmental review concerning the repackaging of Pantex pits into a more robust container. This evaluation is documented in the *Supplement Analysis for: Final Environmental Impact Statement for the Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapon Components—AL–R8 Sealed Insert Container* (August 1998). This document is on the MD Web site at http://www.doe-md.com. Based on this supplement analysis, the decision was made to repackage pits at Pantex into the AL–R8 sealed insert container and to discontinue plans to repackage pits into the AT–400A container.

Worker exposure estimates attributable to the decision to repackage pits in AL–R8 sealed insert containers were incorporated in the revised Section 2.18 and Appendix L.5.1.

The issues raised in this comment relate to pit storage decisions made in the *Storage and Disposition PEIS* and the *Final Environmental Impact Statement for the Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapon Components* (DOE/EIS-0225, November 1996). DOE is considering leaving the repackaged surplus pits in Zone 4 at Pantex for long-term storage. An appropriate environmental review will be conducted when the specific proposal for this change has been developed; addressing, for example, whether additional magazines need to be air-conditioned. The analysis in this SPD EIS assumes that the surplus pits are stored in Zone 12 in accordance with the ROD for the *Storage and Disposition PEIS*.

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DON MONIAK
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decision to abandon this costly program functions to serve its efforts to keep the pits and become a plutonium processor.

3. The argument that worker exposures can be reduced if pits do not need repackaging is not balanced by the fact that worker exposures during secondary canning of plutonium powder (which would be unnecessary in co-located facilities) would be much higher than exposures during pit repackaging. Furthermore, workers at Pantex would be far more likely to suffer internal exposure to plutonium in a plutonium pit processing facility. 1

4. The argument made by DOE mirrors that made by Mr. Carl Beard, Nuclear Program Manager for the Amarillo National Resource Center for Plutonium (ANRCP). In comments on the Draft Surplus Plutonium Disposition EIS, Mr. Beard stated that, "if conversion is not done at Pantex, all the pits would have to be repackaged into AT400 (or some other approved transportation container) and shipped to SRS. This will not have to be done if the facilities are located at Pantex. The EIS estimates a 40% dose reduction to Pantex workers due to this. Were ALARA considerations evaluated as part of this process?" 2

Of course, Mr. Beard and the ANRCP have never raised any ALARA concerns when plutonium pits were unnecessarily shipped from Rocky Flats, and when the Department chose the more complicated MOX fuel option.

These comments will be supplemented in the future.

Sincerely:

Don Moniak
Program Director
STAND, Inc.

FR008

FR008–2 **Human Health Risk**

There would be reduced doses to Pantex workers involved with repackaging pits for shipment to other sites if the pit conversion facility were located at Pantex. There may be some overall advantage in terms of human health risk if the pit conversion facility is collocated with the other surplus plutonium disposition facilities. The SPD EIS presents a conservative estimate of the worker dose associated with operating these facilities. DOE is committed to reducing any human health risks at its sites to ALARA levels. The surplus plutonium disposition facilities would be designed, constructed, and operated to achieve these goals.

Pits were shipped from RFETS to Pantex to support activities DOE felt were necessary at RFETS. The MOX approach is a reasonable alternative because it is an effective way to accomplish the goal of the surplus plutonium disposition program. Converting the surplus plutonium into MOX fuel and using it in domestic, commercial reactors would reduce the threat of nuclear weapons proliferation worldwide by conducting disposition of surplus plutonium in the United States in an environmentally safe and timely manner. Section 4.28 was revised to discuss the potential environmental impacts of operating the reactors that would use the MOX fuel, should the decision be made to proceed with the hybrid approach. Pursuing both immobilization and MOX fuel fabrication provides the United States important insurance against potential disadvantages of implementing either approach by itself. The hybrid approach also provides the best opportunity for U.S. leadership in working with Russia to implement similar options for reducing Russia's excess plutonium in parallel. Further, it sends the strongest possible signal to the world of U.S. determination to reduce stockpiles of surplus plutonium as quickly as possible and in a manner that would make it technically difficult to use the plutonium in nuclear weapons again.

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DON MONIAK
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STAND

June 28, 1999
STAND COMMENT # S-3

Office of Fissile Materials Management
U.S. Department of Energy
1000 Independence Avenue, SW
Washington, D.C. 20585

Dear Department of Energy, Office of Fissile Materials Management:

These are STAND's (Serious Texans Against Nuclear Dumping) third set of comments on the April 1999 *Supplement to the Surplus Plutonium Disposition Draft Environmental Impact Statement.* (SPDEIS)

Subject: Lead Test Assemblies, Uranium Feed, and Bad MOX Fuel

In the final SPDEIS, STAND is requesting that DOE:

- Clearly identify all major differences between weapons-grade and reactor-grade plutonium; 1
- Identify and explain the lack of progress in the MOX fuel test program at Los Alamos; 2
- Analyze the environmental, safety, and health impacts of producing uranium oxide powder for MOX that is derived from the "Ammonium Uranyl Carbonate" (AUC) process 3
- Analyze the option of having Los Alamos or other DOE entities produce off-spec MOX fuel as an alternative immobilization route for plutonium pits. 4

Background for Request

A March 1999 Los Alamos National Laboratory (LANL) report[1] calls into question the ability of the lab to successfully fabricate Mixed Oxide (MOX) test fuel using weapons-grade plutonium. At the root of the problem is that "weapons-grade plutonium morphology (shape) differs significantly than that of reactor-grade plutonium." These fundamental differences must be clearly identified in the final SPDEIS. 2

Los Alamos is the lead laboratory for the MOX fuel fabrication program while Oak Ridge National Laboratory is the lead lab for irradiating the fuel made at LANL and "post-irradiation" exams of that fuel, barring major accidents. The Department of Energy's goal was to begin conducting a "High Power Test" of MOX fuel pellets during April, 1999 in the "Advanced Test Reactor" (ATR) at INEEL.[2]

[1] LA-UR-99-1533. *Nuclear fuels technologies status report on feed materials baseline development and test fuel fabrication progress.* H. T. Blair, P. Chodak, S. L. Eaton, and A. D. Neuman. Los Alamos National Laboratory March, 1999.

[2] *FY 1999 Annual Operating Plan.* (Rev 0, October 1, 1998). DOE Office of Fissile Materials Disposition.

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FR006

FR006–1 **MOX Approach**

The major difference between weapons-grade plutonium and reactor-grade plutonium (i.e., plutonium recovered from spent nuclear fuel) is the level of plutonium 239. The level of plutonium 239 is lower in reactor grade plutonium. DOE recognizes that European MOX programs use different enrichment levels. However, European enrichment levels are more tied to programmatic needs and not to specific limits on plutonium 239. The plutonium 239 levels being proposed in this EIS may be higher than those in Europe but are still considered safe. If any specific safety limits or restrictions are required, they would be identified by NRC during the license amendment process.

FR006–2 **MOX Approach**

The plutonium dioxide feed to the MOX facility would be calcined, oxalate-derived material that would have morphology identical to that of the oxide used successfully in Europe to make MOX fuel.

Fuel fabrication R&D at LANL was sponsored in order to fabricate test fuel for irradiation in the Advanced Test Reactor at INEEL. Fuel for the first irradiation test was fabricated successfully. The second irradiation test was canceled based on technical input from DCS, the team that was selected to fabricate MOX fuel and irradiate it. Fuel R&D continues at LANL because further developing a domestic MOX fuel fabrication capability is useful to DOE for lead assembly fabrication and for other programmatic purposes, especially related to characterizing the feed powder from the pit conversion facility.

The difficulties encountered with fabrication of MOX test fuel at LANL are due neither to the lack of MOX fuel fabrication capability at LANL nor to generic technical difficulties associated with weapons-grade plutonium. These difficulties have been determined to be primarily due to switching the uranium oxide used in the MOX test fuel. LANL had successfully fabricated MOX test fuel for the first irradiation test using an uranium oxide commercially supplied by CAMECO. To begin fabrication of the MOX test fuel for the second irradiation test, uranium oxide from the ammonium uranyl carbonate process was used and it proved to be a problem.

STAND OF AMARILLO, INC.
DON MONIAK
PAGE 2 OF 3

In the past two years alone, the Department of Energy has allocated $3.425 million for MOX fuel fabrication research and development work at Los Alamos, and another $10.075 million on the program to irradiate the test pellets in the Advanced Test Reactor[3] (3). To date, fourteen batches of MOX test fuel pellets for this project have failed to meet technical specification and/or had some or all of the following unacceptable problems:

--"end capping"
--cracking on top
--bubbling when submerged in alcohol

These dismal results involved plutonium oxide powder produced from both dry (pyroprocessing) and wet (liquid acid) plutonium metal-to-oxide conversion processes. While the authors complained of running low on plutonium made from DOE's preferred conversion alternative called HYDOX, they failed to mention that in 1998 HYDOX was "retracted from the ARIES line by NMT-DO for safety reasons."[4] 2

In the final SPDEIS, DOE should identify the lack of progress in its MOX fuel test program and explain how spending millions of dollars on future efforts is justified. While Los Alamos plutonium programs--HYDOX, MOX, TIGR--continue to encounter delays and failures, the lab remains the Department's "preferred alternative" to fabricate MOX "Lead Test Assemblies" for use in commercial reactors. DOE should answer whether failure in the Los Alamos R&D projects are a function of site-specific incompetency or generic technical difficulty associated with weapons-grade plutonium.

The latest results at LANL involve MOX test fuel using uranium oxide powder derived from the "Ammonium Uranyl Carbonate" (AUC) process--the same process that has supplied uranium oxide for more than 90% of the world's supply of commercial MOX fuel. Since making MOX fuel for Light Water Nuclear Reactors generally involves a mix of 3-5% plutonium oxide powder and 95-97% uranium oxide powder, it is obvious that the uranium must be compatible with the plutonium. In the final SPDEIS, DOE must analyze the environmental, safety, and health impacts of uranium oxide powder production using the Ammonium Uranyl Carbonate process. 3

Given the fact that DOE's MOX program is having severe difficulties in the test phase, STAND requests that the option of immobilizing plutonium in "bad" MOX fuel be analyzed in the final SPDEIS. The disposition of excess plutonium using "off-spec" MOX pellets as a final immobilization waste form was raised in 1996 by G.A. Armantrout and L.J. Jardine.[5] 4

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[3]FYs 1998 (Rev. 8) and 1999 (Rev. 0) *Annual Operating Plans*. DOE Office of Fissile Materials.

[4]September 28, 1998 Memorandum from U.S. DOE-Los Alamos Area Office to Bruce Matthews, Division Director, NMT-DO, LANL, MS-E500. *Approval of ARIES Project Hazard Analyses and Required Safety Controls*. Attachment 1. Page 10.

[5] Armantrout, G.A. and L.J. Jardine. *Disposition of Excess Plutonium Using "Off-Spec" MOX Pellets as a Sintered Ceramic Waste Form*. UCRL-JC-121830. Lawrence Livermore National Laboratory.

FR006

FR006–3 **MOX Approach**

Section 4.30.3 was added to this SPD EIS to evaluate the environmental impacts of converting depleted uranium hexafluoride to depleted uranium dioxide using a commercially available dry conversion process. As described in the *Initial Data Report in Response to the SPD EIS Data Call for the UO_2 Supply* (ORNL/TM-13466, November 1997), dry conversion is a proven technology for uranium dioxide production that is currently available at four domestic commercial fuel production facilities. The dry conversion process is a more efficient process than the ammonium diuranate wet conversion process and as indicated by the commentor, the wet process has proven to be more problematic in ongoing experiments at LANL.

FR006–4 **Alternatives**

Off-specification MOX fuel pellets would not normally be sent to the immobilization facility. As described in Section 2.4.3.2, MOX fuel pellets that do not meet specifications would be recycled in the MOX process line. Section 4.30 discusses the incremental impacts that would be expected if plutonium originally designated for MOX fuel (such as rejected MOX fuel) had to be immobilized instead.

Los Alamos has a proven ability to make off-spec MOX fuel pellets, and the technology for MOX fuel fabrication is highly advanced. DOE should consider a long-term strategy of immobilizing the plutonium found in pits in off-spec MOX fuel pellets. 4

These comments will be supplemented in the future.

Sincerely;

Don Moniak
Program Director
STAND of Amarillo, Inc.

FR006